Sequence Listing

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   Gao, Wei-Qiang
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   Pan, James
   Roy, Margaret Ann
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   Tumas, Daniel
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   Wood, William I.
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Phe Ala Ile Ala Arg Arg Leu Ala Gln Asp Gly Ala His Val Val
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Val Ser Ser Arg Lys Gln Gln Asn Val Asp Gln Ala Val Ala Thr
65 70 75

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 Lys Thr Leu Asp Ile Asn Val Lys Ala Pro Ala Leu Met Thr Lys
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 Pro Tyr Asn Val Ser Lys Thr Ala Leu Leu Gly Leu Thr Lys Thr
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Gly Trp Gly Gly Leu Arg Leu Leu Asn Gly Leu Pro Pro Gly Ser 35 40 45

Phe Val Pro Arg Pro His Thr Ala Pro Leu Gly Gly Ala His Ala
50 55 60

His Val Leu Gly Met Val Pro Pro Ala Cys Leu Pro Gly Asp Glu
65 70 75

Val Gly Ser Glu Gln Arg Gly Glu Gln Val Thr Asn Gly Arg Glu 80 85 90

Ala Gly Ala Glu Leu Leu Thr Glu Val Asn Arg Leu Gly Ser Gly
95 100 105

Ser Ser Ala Ala Ser Glu Glu Glu Glu Glu Glu Glu Pro Pro 110 Arg Arg Thr Leu His Leu Arg Arg Asn Arg Ile Ser Asn Cys Ser 125 Gln Arg Ala Gly Ala Arg Pro Gly Ser Leu Pro Glu Arg Lys Gly 140 150 Pro Glu Leu Cys Leu Glu Glu Leu Asp Ala Ala Ile Pro Gly Ser Arg Ala Val Gly Gly Ser Lys Ala Arg Val Gln Ala Arg Gln Val 175 Pro Pro Ala Thr Ala Ser Glu Trp Arg Leu Ala Gln Ala Gln Gln Lys Ile Arg Glu Leu Ala Ile Asn Ile Arg Met Lys Glu Glu Leu Ile Gly Glu Leu Val Arg Thr Gly Lys Ala Ala Gln Ala Leu Asn 215 225 Arg Gln His Ser Gln Arg Ile Arg Glu Leu Glu Gln Glu Ala Glu Gln Val Arg Ala Glu Leu Ser Glu Gly Gln Arg Gln Leu Arg Glu Leu Glu Gly Lys Glu Leu Gln Asp Ala Gly Glu Arg Ser Arg Leu Gln Glu Phe Arg Arg Val Ala Ala Ala Gln Ser Gln Val Gln Val Leu Lys Glu Lys Lys Gln Ala Thr Glu Arg Leu Val Ser Leu Ser Ala Gln Ser Glu Lys Arg Leu Gln Glu Leu Glu Arg Asn Val 315 Gln Leu Met Arg Gln Gln Gln Gln Leu Gln Arg Leu Arg Glu Glu Thr Glu Gln Lys Arg Leu Glu Ala Glu Met Ser Lys Arg Gln His Arg Val Lys Glu Leu Glu Leu Lys His Glu Gln Gln Gln Lys Ile Leu Lys Ile Lys Thr Glu Glu Ile Ala Ala Phe Gln Arg Lys Arg Arg Ser Gly Ser Asn Gly Ser Val Val Ser Leu Glu Gln Gln Gln Lys Ile Glu Glu Gln Lys Lys Trp Leu Asp Gln Glu

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Leu	Met	Gln	Glu	Lys 440	Thr	Gly	Leu	Glu	Ser 445	Lys	Arg	Leu	Arg	Ser 450
Ser	Gln	Ala	Leu	Asn 455	Glu	Asp	Ile	Val	Arg 460	Val	Ser	Ser	Arg	Leu 465
Glu	His	Leu	Glu	Lys 470	Glu	Leu	Ser	Glu	Lys 475	Ser	Gly	Gln	Leu	Arg 480
Gln	Gly	Ser	Ala	Gln 485	Ser	Gln	Gln	Gln	Ile 490	Arg	Gly	Glu	Ile	Asp 495
Ser	Leu	Arg	Gln	Glu 500	Lys	Asp	Ser	Leu	Leu 505	Lys	Gln	Arg	Leu	Glu 510
Ile	Asp	Gly	Lys	Leu 515	Arg	Gln	Gly	Ser	Leu 520	Leu	Ser	Pro	Glu	Glu 525
Glu	Arg	Thr	Leu	Phe 530	Gln	Leu	Asp	Glu	Ala 535	Ile	Glu	Ala	Leu	Asp 540
Ala	Ala	Ile	Glu	Tyr 545	Lys	Asn	Glu	Ala	Ile 550	Thr	Cys	Arg	Gln	Arg 555
Val	Leu	Arg	Ala	Ser 560	Ala	Ser	Leu	Leu	Ser 565	Gln	Cys	Glu	Met	Asn 570
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				Gln 605					610					615
				Arg 620					625					630
				Glu 635					640					645
				Asn 650					655					660
				Gly 665					670					675
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 Glu Thr Arg Asp Leu Val His Ala Pro Leu Pro Leu Thr Trp Lys
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Arg Gln Arg Glu Ala Ala Glu Pro Leu Val Gly Arg Val Leu Pro
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Gly Ser Gly Leu Trp Leu Cys Gln Pro Thr Pro Arg Cys Gly Asn 35 40 45

Lys Ile Tyr Asn Pro Ser Glu Gln Cys Cys Tyr Asp Asp Ala Ile
50 55 60

Leu Ser Leu Lys Glu Thr Arg Arg Cys Gly Ser Thr Cys Thr Phe 65 70 75

Trp Pro Cys Phe Glu Leu Cys Cys Pro Glu Ser Phe Gly Pro Gln
80 85 90

Gln Lys Phe Leu Val Lys Leu Arg Val Leu Gly Met Lys Ser Gln
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35 40 45

Glu Lys Arg Glu His Ala Thr Arg Asp Gly Pro Gly Arg Val Asn
50 55 60

Glu Leu Gly Arg Pro Ala Arg Asp Glu Gly Gly Ser Gly Arg Asp
65 70 75

Trp Lys Ser Lys Ser Gly Arg Gly Leu Ala Gly Arg Glu Pro Trp 80 85 90

Ser Lys Leu Lys Gln Ala Trp Val Ser Gln Gly Gly Ala Lys 95 100 105

Ala Gly Asp Leu Gln Val Arg Pro Arg Gly Asp Thr Pro Gln Ala 110 115 120

Glu Ala Leu Ala Ala Ala Gln Asp Ala Ile Gly Pro Glu Leu 125 130 135

Ala Pro Thr Pro Glu Pro Pro Glu Glu Tyr Val Tyr Pro Asp Tyr
140 145 150

Arg Gly Lys Gly Cys Val Asp Glu Ser Gly Phe Val Tyr Ala Ile 155 160 165

Gly Glu Lys Phe Ala Pro Gly Pro Ser Ala Cys Pro Cys Leu Cys 170 175 180

Thr Glu Glu Gly Pro Leu Cys Ala Gln Pro Glu Cys Pro Arg Leu 185 190 195

His Pro Arg Cys Ile His Val Asp Thr Ser Gln Cys Cys Pro Gln
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Cys Lys Glu Arg Lys Asn Tyr Cys Glu Phe Arg Gly Lys Thr Tyr 215 220 225

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- <211> 437
- <212> PRT
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- Asn Thr Ser Cys Asp Ser Gly Leu Gly Cys Gln Asp Thr Leu Met
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- Leu Ile Glu Ser Gly Pro Gln Val Ser Leu Val Leu Ser Lys Gly
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- Cys Thr Glu Ala Lys Asp Gln Glu Pro Arg Val Thr Glu His Arg 80 85 90
- Met Gly Pro Gly Leu Ser Leu Ile Ser Tyr Thr Phe Val Cys Arg 95 100 105
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- Ala Pro Gln Pro Pro Ala Asp Pro Gly Ser Leu Arg Cys Pro Val 125 130 135
- Cys Leu Ser Met Glu Gly Cys Leu Glu Gly Thr Thr Glu Glu Ile 140 \$145
- Cys Pro Lys Gly Thr Thr His Cys Tyr Asp Gly Leu Leu Arg Leu 155 160 165
- Arg Gly Gly Ile Phe Ser Asn Leu Arg Val Gln Gly Cys Met 170 175 180
- Pro Gln Pro Gly Cys Asn Leu Leu Asn Gly Thr Gln Glu Ile Gly 185 190 195
- Pro Val Gly Met Thr Glu Asn Cys Asn Arg Lys Asp Phe Leu Thr 200 205 210
- Cys His Arg Gly Thr Thr Ile Met Thr His Gly Asn Leu Ala Gln
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- Glu Pro Thr Asp Trp Thr Thr Ser Asn Thr Glu Met Cys Glu Val

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Gln	Asn	Ser	Gln	Lys 275	Thr	Thr	Ile	His	Ser 280	Ala	Pro	Pro	Gly	Val 285
Leu	Val	Ala	Ser	Tyr 290	Thr	His	Phe	Cys	Ser 295	Ser	Asp	Leu	Сув	Asn 300
Ser	Ala	Ser	Ser	Ser 305	Ser	Val	Leu	Leu	Asn 310	Ser	Leu	Pro	Pro	Gln 315
Ala	Ala	Pro	Val	Pro 320	Gly	Asp	Arg	Gln	Cys 325	Pro	Thr	Cys	Val	Gln 330
Pro	Leu	Gly	Thr	Cys 335	Ser	Ser	Gly	Ser	Pro 340	Arg	Met	Thr	Cys	Pro 345
Arg	Gly	Ala	Thr	His 350	Сув	Tyr	Asp	Gly	Tyr 355	Ile	His	Leu	Ser	Gly 360
Gly	Gly	Leu	Ser	Thr 365	Lys	Met	Ser	Ile	Gln 370	Gly	Cys	Val	Ala	Gln 375
Pro	Ser	Ser	Phe	Leu 380	Leu	Asn	His	Thr	Arg 385	Gln	Ile	Gly	Ile	Phe 390
Ser	Ala	Arg	Glu	Lys 395	Arg	Asp	Val	Gln	Pro 400	Pro	Ala	Ser	Gln	His 405
Glu	Gly	Gly	Gly	Ala 410	Glu	Gly	Leu	Glu	Ser 415	Leu	Thr	Trp	Gly	Val 420
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Ser Cys

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<211> 2387 <212> DNA

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<213> Homo sapiens

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Tyr Phe Gly Thr Lys Thr Arg Tyr Glu Asp Val Asn Pro Val Leu
50 55 60

Leu Ser Gly Pro Glu Ala Pro Trp Arg Asp Pro Glu Leu Leu Glu
65 70 75

Gly Thr Cys Thr Pro Val Gln Leu Val Ala Leu Ile Arg His Gly 80 85 90

Thr Arg Tyr Pro Thr Val Lys Gln Ile Arg Lys Leu Arg Gln Leu 95 100

His Gly Leu Leu Gln Ala Arg Gly Ser Arg Asp Gly Gly Ala Ser

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Ser	Thr	Gly	Ser	Arg 125	Asp	Leu	Gly	Ala	Ala 130	Leu	Ala	Asp	Trp	Pro 135
Leu	Trp	Tyr	Ala	Asp 140	Trp	Met	Asp	Gly	Gln 145	Leu	Val	Glu	Lys	Gly 150
Arg	Gln	Asp	Met	Arg 155	Gln	Leu	Ala	Leu	Arg 160	Leu	Ala	Ser	Leu	Phe 165
Pro	Ala	Leu	Phe	Ser 170	Arg	Glu	Asn	Tyr	Gly 175	Arg	Leu	Arg	Leu	Ile 180
Thr	Ser	Ser	Lys	His 185	Arg	Cys	Met	qaA	Ser 190	Ser	Ala	Ala	Phe	Leu 195
Gln	Gly	Leu	Trp	Gln 200	His	Tyr	His	Pro	Gly 205	Leu	Pro	Pro	Pro	Asp 210
Val	Ala	Asp	Met	Glu 215	Phe	Gly	Pro	Pro	Thr 220	Val	Asn	Asp	Lys	Leu 225
Met	Arg	Phe	Phe	Asp 230	His	Cys	Glu	Lys	Phe 235	Leu	Thr	Glu	Val	Glu 240
Lys	Asn	Ala	Thr	Ala 245	Leu	Tyr	His	Val	Glu 250	Ala	Phe	Lys	Thr	Gly 255
Pro	Glu	Met	Gln	Asn 260	Ile	Leu	Lys	Lys	Val 265	Ala	Ala	Thr	Leu	Gln 270
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				290	Asp				295					300
				305	Asp				310					315
				320	Gln				325			-		330
				335	Ser				340		-			345
				350	Val				355					360
				365	Leu				370					375
				380	Met				385					390
Thr	Ala	Tyr	Asn	Tyr 395	Lys	Lys	Gln	Met	His	Arg	Lys	Phe	Arg	Ser 405

Gly Leu Ile Val Pro Tyr Ala Ser Asn Leu Ile Phe Val Leu Tyr 420

His Cys Glu Asn Ala Lys Thr Pro Lys Glu Gln Phe Arg Val Gln 435

Met Leu Leu Asn Glu Lys Val Leu Pro Leu Ala Tyr Ser Gln Glu 450

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<213> Homo sapiens

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Ile Trp Phe Pro Glu Glu Lys Pro Leu Pro Thr Ala Phe Leu Val

Asp Thr Ser Glu Glu Ala Leu Leu Leu Pro Asp Trp Leu Lys Leu 50 55 60

Arg Met Ile Arg Ser Glu Val Leu Arg Leu Val Asp Ala Ala Leu 65 70 75

Gln Asp Leu Glu Pro Gln Gln Leu Leu Phe Val Gln Ser Phe
80 85 90

Gly Ile Pro Val Ser Ser Met Ser Lys Leu Leu Gln Phe Leu Asp 95 100 105

Gln Ala Val Ala His Asp Pro Gln Thr Leu Glu Gln Asn Ile Met Asp Lys Asn Tyr Met Ala His Leu Val Glu Val Gln His Glu Arg Gly Ala Ser Gly Gly Gln Thr Phe His Ser Leu Leu Thr Ala Ser Leu Pro Pro Arg Arg Asp Ser Thr Glu Ala Pro Lys Pro Lys Ser Ser Pro Glu Gln Pro Ile Gly Gln Gly Arg Ile Arg Val Gly Thr Gln Leu Arg Val Leu Gly Pro Glu Asp Asp Leu Ala Gly Met Phe Leu Gln Ile Phe Pro Leu Ser Pro Asp Pro Arg Trp Gln Ser Ser Ser Pro Arg Pro Val Ala Leu Ala Leu Gln Gln Ala Leu Gly Gln Glu Leu Ala Arg Val Val Gln Gly Ser Pro Glu Val Pro Gly Ile 235 Thr Val Arg Val Leu Gln Ala Leu Ala Thr Leu Leu Ser Ser Pro His Gly Gly Ala Leu Val Met Ser Met His Arg Ser His Phe Leu Ala Cys Pro Leu Leu Arg Gln Leu Cys Gln Tyr Gln Arg Cys Val Pro Gln Asp Thr Gly Phe Ser Ser Leu Phe Leu Lys Val Leu Leu 290 295 Gln Met Leu Gln Trp Leu Asp Ser Pro Gly Val Glu Gly Gly Pro Leu Arg Ala Gln Leu Arg Met Leu Ala Ser Gln Ala Ser Ala Gly Arg Arg Leu Ser Asp Val Arg Gly Gly Leu Leu Arg Leu Ala Glu Ala Leu Ala Phe Arg Gln Asp Leu Glu Val Val Ser Ser Thr Val Arg Ala Val Ile Ala Thr Leu Arg Ser Gly Glu Gln Cys Ser Val 365 Glu Pro Asp Leu Ile Ser Lys Val Leu Gln Gly Leu Ile Glu Val Arg Ser Pro His Leu Glu Glu Leu Leu Thr Ala Phe Phe Ser Ala

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Gln	Lys	Arg	Arg	Glu 560	Glu	Leu	Val	Leu	Arg 565	Val	Gln	Gly	Pro	Glu 570
Leu	Ile	Ser	Leu	Val 575	Glu	Leu	Ile	Leu	Ala 580	Glu	Ala	Glu	Thr	Arg 585
Ser	Gln	Asp	Gly	Asp 590	Thr	Ala	Ala	Cys	Ser 595	Leu	Ile	Gln	Ala	Arg 600
Leu	Pro	Leu	Leu	Leu 605	Ser	Cys	Cys	Cys	Gly 610	Asp	Asp	Glu	Ser	Val 615
Arg	Lys	Val	Thr	Glu 620	His	Leu	Ser	Gly	Cys 625	Ile	Gln	Gln	Trp	Gly 630
Asp	Ser	Val	Leu	Gly 635	Arg	Arg	Cys	Arg	Asp 640	Leu	Leu	Leu	Gln	Leu 645
Tyr	Leu	Gln	Arg	Pro 650	Glu	Leu	Arg	Val	Pro 655	Val	Pro	Glu	Val	Leu 660
Leu	His	Ser	Glu	Gly 665	Ala	Ala	Ser	Ser	Ser 670	Val	Cys	Lys	Leu	Asp 675
Gly	Leu	Ile	His	Arg 680	Phe	Ile	Thr	Leu	Leu 685	Ala	Asp	Thr	Ser	Asp 690

Ser Arg Ala Leu Glu Asn Arg Gly Ala Asp Ala Ser Met Ala Cys Arg Lys Leu Ala Val Ala His Pro Leu Leu Leu Arg His Leu 715 Pro Met Ile Ala Ala Leu Leu His Gly Arg Thr His Leu Asn Phe Gln Glu Phe Arg Gln Gln Asn His Leu Ser Cys Phe Leu His Val Leu Gly Leu Leu Glu Leu Leu Gln Pro His Val Phe Arg Ser Glu His Gln Gly Ala Leu Trp Asp Cys Leu Leu Ser Phe Ile Arg Leu 775 Leu Leu Asn Tyr Arg Lys Ser Ser Arg His Leu Ala Ala Phe Ile Asn Lys Phe Val Gln Phe Ile His Lys Tyr Ile Thr Tyr Asn Ala Pro Ala Ala Ile Ser Phe Leu Gln Lys His Ala Asp Pro Leu His 815 820 Asp Leu Ser Phe Asp Asn Ser Asp Leu Val Met Leu Lys Ser Leu 835 Leu Ala Gly Leu Ser Leu Pro Ser Arg Asp Asp Arg Thr Asp Arg 850 Gly Leu Asp Glu Glu Glu Glu Glu Ser Ser Ala Gly Ser Leu Pro Leu Val Ser Val Ser Leu Phe Thr Pro Leu Thr Ala Ala Glu 875 880 Met Ala Pro Tyr Met Lys Arg Leu Ser Arg Gly Gln Thr Val Glu Asp Leu Leu Glu Val Leu Ser Asp Ile Asp Glu Met Ser Arg Arg 905 Arg Pro Glu Ile Leu Ser Phe Phe Ser Thr Asn Leu Gln Arg Leu 925 Met Ser Ser Ala Glu Glu Cys Cys Arg Asn Leu Ala Phe Ser Leu Ala Leu Arg Ser Met Gln Asn Ser Pro Ser Ile Ala Ala Ala Phe 950 955 Leu Pro Thr Phe Met Tyr Cys Leu Gly Ser Gln Asp Phe Glu Val Val Gln Thr Ala Leu Arg Asn Leu Pro Glu Tyr Ala Leu Leu Cys

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<212> DNA

<213> Homo sapiens

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Ala	Leu	Arg	Lys	Glu 395	His	Val	Asn	Pro	Pro 400	Ala	Glu	Val	Ser	Thr 405
Ser	Leu	Lys	Thr	Tyr 410	Gln	His	Phe	Thr	Leu 415	Glu	Lys	Ala	Tyr	Leu 420
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Ile	Arg	Phe	Arg	Phe 440	Phe	Gln	Pro	Leu	Arg 445	Leu	Glu	Arg	Phe	Phe 450
Phe	Arg	Ser	Gly	Asn 455	Ile	Glu	His	Pro	Glu 460	Asp	Lys	Leu	Phe	Asn 465
Thr	Ser	Val	Glu	Val 470	Leu	Pro	Phe	Asp	Asn 475	Pro	Gln	Ser	Asp	Lys 480
Glu	Ala	Leu	Gln	Glu 485	Gly	Arg	Thr	Ala	Thr 490	Leu	Arg	Tyr	Pro	Arg 495
Ser	Pro	Asp	Gly	Tyr 500	Leu	Gln	Ile	Gly	Ser 505	Phe	Tyr	Lys	Gly	Val 510
Ala	Glu	Gly	Glu	Val 515	Asp	Pro	Ala	Phe	Gly 520	Pro	Leu	Glu	Ala	Leu 525
Arg	Leu	Ser	Ile	Gln 530	Thr	Asp	Ser	Pro	Val 535	Trp	Val	Ile	Leu	Ser 540
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